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# Harmony as a cue for the transition from fusion to agglutination\*

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## Abstract

We examine a vowel assimilation process attested in a group of Asia Minor Greek dialects which superficially looks like vowel harmony. We propose, however, that vowel assimilation is actually a feature spreading process actualizing a reanalysis in the nominal inflection, which was facilitated by the language contact with Turkish. More specifically, it signals a ‘new’ stem formation, in which the theme vowel of the ending or the whole ending loses its status as a constituent and incorporates into the stem. Vowel assimilation is not attested in agglutinative inflection because in this case the ‘new’ status of the theme vowel or of the old ending as part of the stem is morphologically transparent.

**Keywords:** actualization, Asia Minor Greek, feature-spreading, (morphological) reanalysis, vowel harmony

## 1. Background: Asia Minor Greek

Asia Minor Greek (AMG) dialects have been affected by the long-term language contact with Turkish in a way that they exhibit interference at all grammatical levels (Dawkins 1910, 1916; Janse 2002, 2009; see also Thomason & Kaufman 1988; Johanson 2002). Among the potential contact-induced phenomena referred in the literature one finds the existence of an agglutinative pattern in nominal inflection and the emergence of a harmony-like vowel process.

In AMG dialects both a fusional and an agglutinative nominal paradigm are attested (Dawkins 1916; Janse 2004; Spyropoulos & Kakarikos 2009, 2011; Karatsareas 2011; Ralli 2009). The first one is similar to the Modern Greek nominal inflectional system, whereas the latter is associated with Turkish morphology. Interestingly, these patterns may even co-exist in the same variety. Fusional inflection is mainly attested in the most conservative varieties that have not undergone deep

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changes due to Turkish interference (e.g., the Cappadocian variety of Delmeso, Pharasa, Silli). On the other hand, agglutination is more salient in the most turkicized varieties, such as the varieties of Ulaghatsh, Semendere and Ferték of the Cappadocian group. Some illustrative examples are presented in Table 1 and 2 respectively:

		<b>Delmeso</b>			<b>Potamia</b>	<b>Axos</b>
<b>SG</b>	NOM	pondzikos	papas	neka	askeris	lero
	GEN	pondziku	papađju	nekas	askerju	leru
	ACC	pondziko	papa	neka	askeri	lero
<b>PL</b>	NOM	pondziki	papađes	nekes	askeri	lera
	GEN					
	ACC	pondzikus	papađes	nekes	askerjus	lera
		‘mouse’	‘priest’	‘woman’	‘soldier’	‘water’

Table 1. Fusional declension

		<b>Axos</b>		<b>Fertek</b>	<b>Ulaghatsh</b>	
<b>SG</b>	NOM	fovos	neyeli	γeros	neka	miło
	GEN	fovozju	neyelju	γerozju	nekaju	miłojju
	ACC	fovos	neyeli	γeros	neka	miło
<b>PL</b>	NOM	fovozja	neyeles	γerozja	nekes	miłoja
	GEN		neyelezju		nekezju	
	ACC	fovozja	neyeles	γerozja	nekes	miłoja
		‘fear’	‘herd’	‘old man’	‘woman’	‘mill’

Table 2. Agglutinative declension

Similarly, in certain AMG dialects we observe the development of a vowel assimilation process, which looks like the vowel harmony that is familiar from Turkish (see also Revithiadou et al. 2006; van Oostendorp & Revithiadou 2005; van Oostendorp 2005):

(1a) /ðáskal-os/      ðáskolos      ‘teacher’ Phar, An48:20<sup>1</sup>

(1b) /ánem-os/      ánomos      ‘wind’ Axo, MK9<sup>2</sup>

(1c) /ípn-os/      júpnus      ‘sleep’ Sil, Ko35<sup>3</sup>

<sup>1</sup> An48: Andriotis (1948)

<sup>2</sup> MK: Mavroxalyvidis & Kesisoglou (1960)

<sup>3</sup> Ko: Kostakis (1968)

Interestingly, this process is sensitive to the morphological category of the word since it is attested only in nouns. Moreover, it has a strictly disyllabic domain of application; it emerges only in the end of the word, between the ending and the stem. Finally, it applies only to nouns which are inflected according to the fusional paradigm. All these characteristics provide a solid ground for establishing a close association between the vowel assimilation process and the fusional declension.

In this article we focus on vowel assimilation with emphasis on its integral relation to the type of morphological paradigms. We also show that it is the side-effect of certain developments that led to the reorganization of the nominal morphology in AMG varieties and, more specifically, of the reanalysis of the morphological status of theme vowels and old endings as parts of the stem.

## 2. The development of vowel harmony (or something like harmony)

As mentioned above, certain AMG dialects (e.g., Silli, Axos, Delmeso, Livisi, Pharasa) developed a vowel process which looks superficially like vowel harmony in Turkish (Revithiadou et al. 2006):

- (2a) /petʃét-a/      petʃáta      ‘napkin’ Sil, Ko185  
 (2b) /ðáskal-os/      ðáskolos      ‘teacher’ Phar, An48:20  
 (2c) /ánem-os/      ánomos      ‘wind’ Axo, MK9  
 (2d) /kóskin-o/      kóskunu<sup>4</sup>      ‘sieve’ Sil, Ko32

Nevertheless, this process is dramatically different from the type of harmony attested in Turkish (van Oostendorp 2005), as it is characterized by some distinct properties: First, it is sensitive to the morphological category of nouns, it depends on case specification and appears only in nom/acc.sg forms, and it has exceptions. Second, in contrast to the vowel harmony of the Turkish type (4), the AMG harmony-like process operates in a strictly binary domain – and not across the board – and it has a leftward directionality, i.e. from the ending to the stem (3).

### (3) AMG harmony-like process

- (3a) /petʃéta/      petʃáta      ‘napkin’ Sil, Ko185  
 (3b) /ípnos/      júpnus      ‘sleep’ Sil, Ko35

<sup>4</sup> Unstressed mid vowels raise in Silli, especially word finally (Dawkins 1916: 42).

## (4) Turkish vowel harmony

	NOM.SG	GEN.SG	NOM.PL	GEN.PL	
(4a)	/iʃ/	/iʃin/	/iʃler/	/iʃlerin/	‘name’
(4b)	/kuuz/	/kuuzun/	/kuuzlar/	/kuuzlarun/	‘girl’

Third, the final vowel requires the preceding one to agree with it in backness/frontness and roundness, the latter affecting indiscriminately non-high vowels, unlike rounding harmony in Turkish (e.g., e-**a** → a-a, o-**a** → a-a, a-**o** → o-o, e-**o** → o-o):<sup>5</sup>

(5a)	/petʃét-a/	petʃáta	‘napkin’ Sil, Ko185
(5b)	/pandeleímon-as/	pandeleímanas	‘merciful’ Sil, Ko151
(5c)	/ðáskal-os/	ðáskolos	‘teacher’ Phar, An48:20
(5d)	/ánem-os/	ánomos	‘wind’ Axo, MK9
(5e)	/kóskin-o/	kóskunu	‘sieve’ Sil, Ko32
(5f)	/ípn-os/	júpnu	‘sleep’ Sil, Ko35

Fourth, the process is stress-sensitive since it affects mainly words stressed on the (ante)penultimate syllable. However, a stressed final vowel can be a trigger in disyllabic words, as illustrated in the examples in (6):

(6a)	/xristós/	xrustós	‘Jesus’ Liv, OACAMS IE’ <sup>6</sup>
(6b)	/θimós/	sumós	‘anger’ Sil, Ko35

Fifth, epenthetic vowels which are inserted to split up consonant clusters are not impervious to the effects of the rule:

(7)	/kastro/	kas.t <u>u</u> .ru	‘castle’ Sil, Ko35
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Following van Oostendorp (2005), we claim that the process at hand lacks the basic properties of harmony and, moreover, cannot be efficiently treated as such under current phonological theories of harmony. We propose, therefore, that it is a novel phonological process which aims at feature-spreading (F-spreading) and emerged when certain morphological pressures were exercised in the system. In the remainder of this article we explore the morphological developments that led to the rise of the F-

<sup>5</sup> Since the process is limited to nom./acc.sg forms, which are typically realized with endings that contain the vowels /a/ and /o/, it is empirically impossible to explore how other vowel combinations would behave.

<sup>6</sup> OACAMS IE’: Oral Archives of the Center of Asia Minor Studies IE’ for Livisi.

spreading rule and, furthermore, the reason it is restricted to varieties with predominantly fusional inflectional patterns.

### 3. From fusion to agglutination

In Asia Minor Greek varieties internal developments as well as language contact with Turkish caused a radical reorganization of the nominal morphological system (Dawkins 1916; Janse 2004; Spyropoulos & Kakarikos 2009, 2011; Karatsareas 2009, 2011; Ralli 2009; Revithiadou & Spyropoulos 2012, a.o.). In Cappadocian Greek varieties this led to the development of agglutinative inflectional patterns. In fact, there is a continuum with dialects of predominantly fusional inflection on one end and dialects with pervasive agglutination on the other. In more conservative varieties (e.g., Delmeso, Silli, Pharasa) agglutination is scarce or non-existent; thus, inflectional patterns are predominantly fusional (F-Group). Interestingly, vowel assimilation is attested mainly in the F-Group dialects. Most of the Cappadocian varieties (e.g., Misti, Axos, etc.) stand somewhere in the middle with a balanced mix of fusion and agglutination (F/A-Group); the vowel assimilation pattern described above is also widely attested in these varieties. In contrast, the more turkicized varieties (e.g., Ulaghatsh, Semendere, Ferteke) exhibit extensive agglutination (A-Group) and no word-final assimilatory processes. Table 1 summarizes the distribution of vowel assimilation across the Cappadocian varieties:

	<b>F-Group</b> Delmeso	<b>F/A-Group</b> Axos, Misti	<b>A-Group</b> Ulaghatsh, Ferteke, Semendere
Vowel assimilation	✓	✓ (only in the fusional paradigm) <sup>7</sup>	×

*Table 3. Distribution of vowel assimilation in AMG dialects*

Tables 4-6 illustrate the most representative patterns of agglutination of nouns ending in *-os*, *-o* and *-a* in mixed and agglutinative-only dialects. The corresponding

<sup>7</sup> The nouns that are most likely to follow the fusional inflectional pattern are the animate ones (and more specifically those that denote human entities or animals to which human properties may be attributed) of Greek origin, whereas the agglutinative pattern is predominantly attested in inanimate nouns and in nouns of Turkish origin (Spyropoulos & Kakarikos 2009, 2011). Moreover, the position of stress seems to affect the distribution of the inflectional paradigms, since nouns stressed on the final syllable tend to be inflected according to the agglutinative pattern.

fusional pattern is illustrated by the Delmesos variety. (The examples are from Dawkins 1916; Andriotis 1948; Kesisoglou 1951; Mavroxalyvidis & Kesisoglou 1960):

		F-Group	F/A-Group		A-Group		
		<i>Delmeso</i>	<i>Axos</i>	<i>Misti</i>	<i>Ulaghatsh</i>		<i>Semendere</i>
SG	NOM	milos	fovos	kapnos	ɣamos	miło	pindikos
	GEN	milu	fovozju	kapnoju	ɣamozju	miłoju	pindikozju
	ACC	miło	fovo(s)	kapno(s)	ɣamos	miło	pindikos
PL	NOM	milus	fovozja	kapnoja	ɣamozja	miłoja	pindiki
	GEN						
	ACC	milus	fovozja	kapnoja	ɣamozja	miłoja	pindiki
		‘mill’	‘fear’	‘smoke’	‘wedding’	‘mill’	‘mouse’

Table 4. Nouns ending in /os/

		F-Group	A-Group		
		<i>Delmeso</i>	<i>Ulaghatsh</i>		<i>Fertek</i>
SG	NOM	ðendro	lero	oryo <sup>8</sup>	lutro
	GEN	ðendru	lerojũ	oryojũ	lutroju
	ACC	ðendro	lero	oryo	lutro
PL	NOM	ðendra	lera	oryata	lutroja
	GEN				
	ACC	ðendra	lera	oryata	lutroja
		‘tree’	‘water’	‘work’	‘bath’

Table 5. Nouns ending in /o/

<sup>8</sup> The Standard Greek form is /erɣo/ ‘work’ which may lead one to assume that the Ulaghatsh form is subject to vowel assimilation. However, the fact that Ulaghatsh does not exhibit instances of vowel assimilation of the type examined here provides a compelling argument in support of /oryo/ as the actual underlying form.

		<b>F-Group</b>	<b>A-Group</b>	
		<i>Delmeso</i>	<i>Ulaghatsh</i> <sup>9</sup>	
<b>SG</b>	NOM	neka	neka	lira
	GEN	nekas	nekaju	liraju
	ACC	neka	neka	lira
<b>PL</b>	NOM	nekes	nekes	liraja
	GEN		nekezju	(lirajaju)
	ACC	nekes	nekes	liraja
		‘woman’	‘woman’	‘pound’

Table 6. Nouns ending in /a/

Focusing on the nature of agglutination in the dialects under examination, we propose that there is a *conservative* and a *radical* type of agglutination. In the conservative type, the nominative singular form has been reanalyzed as a *base* to which inflectional affixes are attached. In these instances, the whole ending (e.g., *-os*, *-o*) has been reanalyzed as constituting part of the stem:

- (8) [stem fov][ending [TH -o][number.case -s]]<sup>10</sup> → [stem fovos] [number.case -∅]  
 (8a) [stem fovos][SG.NOM/ACC -∅] > fovos ‘fear-SG.NOM/ACC’  
 (8b) [stem fovos][GEN -ju] > fovoju ‘fear-GEN’  
 (8c) [stem fovos][PL.NOM/ACC -ja] > fovoja ‘fear-PL.NOM/ACC’

In the radical type, the nominative singular form has been reanalyzed as involving a stem and a suffix that marks the singular. More specifically, in these instances, the theme vowel of the ending, e.g. /-a/, has been reanalyzed as a singular number marker which is replaced in the plural by the default plural marker, i.e. /-es/, resulting in agglutination proper. Thus, genitive forms are formed by adding the genitive suffix /-ju/ after the relevant number formative, i.e. /-a/ for singular and /-es/ for plural: *nek-a-ju* ‘of woman’ vs. *nek-es-ju* ‘of women’.

<sup>9</sup> Plural formation in the agglutinative paradigm depends on animacy (see also footnote 7): the plural of animate nouns is formed with the suffix *-es*, whereas inanimate nouns select the formative *-ja* (Spyropoulos & Kakarikos 2009, 2011).

<sup>10</sup> We analyze the nom.sg ending /-os/ as consisting of a theme element (vowel) /-o/ and a fused case/number formative /-s/ (contra Ralli 2000, 2005 among others). Evidence for such a segmentation comes from the fact that the /-s/ element appears independently in the singular nominative form of other nouns, e.g. *pater-a-s* ‘father’, *naft-i-s* ‘sailor’, *presv-i-s* ‘ambassador’, *γramate-a-s* ‘secretary’. Such a segmentation is, to our point of view, superior to an analysis that treats /-os/ as a single unit, because it captures the generalization that /-s/ alone is a nom.sg formative and dispenses with an extra nom.sg allomorph, namely /-os/.

- (9)  $[\text{stem nek}][\text{ending } [\text{TH -a}][\text{number/case } -\emptyset]] \rightarrow [\text{stem nek}][\text{SG -a}][\text{case } -\emptyset]$
- (9a)  $[\text{stem nek}][\text{SG -a}][\text{GEN -ju}] > \text{nek-a-ju}$  ‘woman-SG-GEN’
- (9b)  $[\text{stem nek}][\text{PL -es}][\text{NOM/ACC } -\emptyset] > \text{nek-es}$  ‘woman-PL-NOM’
- (9c)  $[\text{stem nek}][\text{PL -es}][\text{GEN -ju}] > \text{nek-ez-ju}$  ‘woman-PL-GEN’

Due to space limitations, we will focus on the conservative type in order to describe the morphophonological developments that led to the emergence of the agglutinative paradigm.

#### 4. The proposal

##### 4.1 *Reanalysis in morphological structure and vowel assimilation*

The transition from fusion to agglutination reveals a *reanalysis* in the morphological structure of nouns (cf. Karatsareas 2011; Ralli 2009), according to which the theme vowel of the ending (10) or the whole ending (11) loses its independent status and incorporates to the stem.




- (10a)  $\text{stem} + [\text{ending TH} - \text{number.case exponent}] \rightarrow$   
 $[\text{stem old stem} - \text{TH}] + [\text{number, case exponent(s)}]$
- (10b)  $[\text{stem mil}] + [\text{ending } [\text{TH -o}][\text{number.case -s}]] \rightarrow$   
 $[\text{stem } [\text{old stem mil}][\text{TH -o}]] + [\text{number, case -s, -ju, -ja}]$
- (11a)  $\text{stem} + [\text{ending TH} - \text{number.case exponent}] \rightarrow$   
 $[\text{stem old stem} - [\text{old ending}]] + [\text{number, case exponent(s)}]$
- (11b)  $[\text{stem fov}] + [\text{ending } [\text{TH -o}][\text{number.case -s}]] \rightarrow$   
 $[\text{stem } [\text{old stem fov}] - [\text{old ending -os}]] + [\text{number, case } -\emptyset, -ju, -ja]$

The reanalysis of the morphological constituents in the structure of the nominal inflection led to the emergence of agglutinative inflectional patterns. As a result, fusional inflection in F- and F/A-Group dialects is only superficially fusional because the vowel of the ending forms a coherent unit with the stem. Here, we argue that the reanalysis of the theme vowel of the ending also initiated an F-spreading rule – responsible for the described pattern of vowel assimilation – as the phonological reflection of the structural changes that took place at the morphological level. More specifically, F-spreading constitutes part of the *actualization process* of the reanalysis (in the sense of Harris & Campbell 1995) by signaling the non-transparent morphological status of the theme vowel (or the whole ending). Under this approach,



the old stem and the theme vowel share the same [back] and/or [round] features because they are both bits of the same morphological constituent, i.e. the new stem (see Postma, Hermans & van Oostendorp 2006 for a somewhat similar account of A-Umlaut in Old High German). A stem can serve as a potential licenser for the relevant F of the theme vowel because it is a perceptually strong position and, as such, it can license more contrasts than non-prominent positions (for positional privilege, see Steriade 1994, 1995; Beckman 1997, 1998; Zoll 1996, 1997; Crosswhite 2000; Walker 2004, 2005, 2011; Kaplan 2008a,b, a.o.). Moreover, the [round] and/or [back] features of the theme vowel become more salient, if they are also carried by a stem vowel.

(12) [<sub>stem</sub> old stem - TH] + [<sub>ending</sub> number, case exponent(s)]

- |    |   |    |   |    |   |
|----|---|----|---|----|---|
| a. | đaskal o s  | b. | petʃet a  | c. | koskin o  |
|    |  |    |  |    |  |
|    | <i>đáskolos</i>   |    | <i>petʃáta</i>  |    | <i>kóskuno</i>  |

A welcome result of this analysis is that it can straightforwardly account for the fact that vowel assimilation is attested only in certain forms of nouns (i.e., nom./acc.sg), it is bound to a binary domain and, due to its morphophonological nature, it can have exceptions. It also comes for free that the process is less likely to apply to nouns with final stress because in dialects of the F/A-Group at least such words are more prone to follow the agglutinative inflectional pattern under the compelling influence of Turkish loanwords. In the following section we examine the factors that facilitated the merging of the theme vowel or the whole ending to the old stem, and eventually led to its re-interpretation as part of the stem.

#### 4.2 *Trigger of the reanalysis*

We propose that a possible trigger for the reanalysis in the structure of nominal inflection described above was the gradual leveling of nominative and accusative forms. Note that in Greek the only nouns that have distinct nominative and accusative forms are the nouns ending in *-os* (in both singular and plural) and the masculine nouns ending in *-as* or *-is* (only in singular). In AMG this distinction was further neutralized by a number of developments. First, *Differential Object Marking* (DOM), which was salient in the varieties of the F and F/A-Groups, had the surface effect of

the neutralization of the distinction between nominative and accusative forms.<sup>11</sup> According to this phenomenon, the noun with the object function in the clause appears in the nominative instead of the expected accusative when it is indefinite.

(13) AMG DOM: [acc] → [nom] / [\_\_, -definite, -plural]

(13a) Potamia (Dawkins 1916: Potamia 1, p.456: 1)

istera pikan yamos  
afterwards made-3PL marriage-NOM.SG  
'After that, they got married.'

(13b) Delmeso (Dawkins 1916: 94)

ðeke ena layos  
hit-3SG a hare-NOM.SG  
'He struck a hare.'

By expanding into the functions of the accusative form, the nominative form gave the impression of being the default form, that is, the form which is unspecified for case.

Second, with the loss of gender distinctions (see Karatsareas 2009; Spyropoulos & Kakarikos 2011), most of the inanimate nouns followed the inflectional paradigm of the old neuters in the plural. Such a development was salient in the varieties of the F/A-Group, and eventually all nouns ended up following this pattern in the varieties of the A-Group. Given that the neuter nouns made no nominative – accusative distinction in the singular, those nouns were gradually assimilated to the neuter inflectional pattern by using the nominative form for the accusative. Such a development is expressed for each dialectal group by means of the syncretism rules below:

(13) [acc] → [nom] / [\_\_, -animate, -plural] *F/A-Group*

		<b>Axo</b>		
SG	NOM	kapnos	milos	fovos
	ACC	kapnos	milos	fovos
		'smoke, tobacco'	'mill'	'fear'

<sup>11</sup> See Dawkins (1916); Janse (2004); Spyropoulos & Tiliopoulou (2006); Spyropoulos & Kakarikos (2011); Karatsareas (2011); Spyropoulos (2013) for descriptions and analyses.

(14) [acc] → [nom] / [\_\_, -plural]      A-Group

		Ulaghatsh			
SG	NOM	xerifos	daskalis	likos	papas
	ACC	xerifos	daskalis	likos	papas
		‘man’	‘teacher’	‘wolf’	‘priest’

These developments caused situations where nouns had the same forms for nominative and accusative. Especially in the singular, these forms looked like having zero exponents for case, triggering thus the reanalysis of the whole form as a stem. This reanalysis was facilitated by the large number of loan nouns of Turkish origin, the declension of which made no nominative – accusative distinction in the singular; the common nom/acc form consisted of the stem alone and no overt case/number exponent (= zero exponent).

		Delmesos			Silata	Misti	Ulaghatsh
SG	NOM	dengif	aqlu	qaru	oda	bafa	qardaf
	GEN	dengizju	aqluðju	qaruðju	odaðju	bafaðu	qardaþju
	ACC	dengif	aqlu	qaru	oda	bafa	qardaf
PL	NOM	dengizja	aqluðju	qaruðja	odaðja	bafaða	qardaþju
	GEN						
	ACC	dengizja	aqluðju	qaruðja	odaðja	bafaða	qardaþju
		‘sea’	‘clever’	‘woman’	‘room’	‘elder brother’	‘brother’

Table 7. Turkish loans in AMG

The developments described above triggered the reanalysis of the old ending as part of the stem. In the case of the nouns that followed the agglutinative pattern, this reanalysis was salient, since the new stem, which included the old ending, formed a single unit, a lexical constituent, as opposed to the suffixes *-ju/-ja*, which realized the grammatical properties of the nominal type. On the other hand, in the fusional paradigm, the gradual absorption of the case/number exponent into the stem was not morphologically evident and, therefore, it was eventually expressed – as we argue in this article – by phonological means, i.e. via the vowel assimilation process.

## 5. Conclusions

In this paper we analyzed AMG ‘harmony’ not as a borrowed vowel harmony-rule from Turkish (Revithiadou et al. 2006; van Oostendorp 2005), but as an assimilation process due to an F-spreading rule that was the offshoot of certain important changes that took place in the nominal morphology. More specifically, we proposed that this F-spreading rule was the phonological side-effect of a reanalysis in the nominal inflection, according to which the theme vowel of the ending or the whole ending lost its status as a constituent in the morphological structure and incorporated to the stem.

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